

**MOSPOWER**

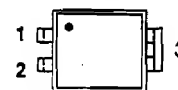
**PRODUCT SUMMARY**

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	$I_D$ (AMPS)
IRFD120	100	0.3	1.3
IRFD123	60	0.4	1.1



4-PIN DIP  
(Similar to TO-250)

TOP VIEW



- 1 GATE  
2 SOURCE  
3 DRAIN

**ABSOLUTE MAXIMUM RATINGS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	IRFD		Units
			120	123	
Drain-Source Voltage		$V_{DS}$	100	60	V
Gate-Source Voltage		$V_{GS}$	$\pm 40$	$\pm 40$	
Continuous Drain Current	$T_A = 25^{\circ}\text{C}$	$I_D$	1.3	1.1	A
	$T_A = 100^{\circ}\text{C}$		0.8	0.7	
Pulsed Drain Current <sup>1</sup>		$I_{DM}$	5.2	4.4	
Power Dissipation	$T_A = 25^{\circ}\text{C}$	$P_D$	1.0	1.0	
	$T_A = 100^{\circ}\text{C}$		0.4	0.4	
Operating Junction & Storage Temperature Range		$T_J, T_{stg}$	-55 to 150		$^{\circ}\text{C}$
Lead Temperature (1/16" from case for 10 secs.)		$T_L$	300		

**THERMAL RESISTANCE RATINGS**

THERMAL RESISTANCE	Symbol	Typ.	Max.	Units
Junction-to-Ambient	$R_{thJA}$	-	120	K/W

<sup>1</sup>Pulse width limited by maximum junction temperature

ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage $V_{GS} = 0, I_D = 250 \mu\text{A}$	IRFD120 IRFD123	$V_{(BR)DSS}$	100 60	-	-	V
Gate Threshold Voltage $V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$		$V_{GS(th)}$	2.0	-	4.0	
Gate-Body Leakage $V_{DS} = 0, V_{GS} = \pm 20 \text{ V}$		$I_{GSS}$	-	-	500	nA
Zero Gate Voltage Drain Current $V_{DS} = V_{(BR)DSS}, V_{GS} = 0$		$I_{DSS}$	-	-	250	$\mu\text{A}$
Zero Gate Voltage Drain Current $V_{DS} = 0.8 \times V_{(BR)DSS}, V_{GS} = 0, T_J = 125^\circ\text{C}$		$I_{DSS}$	-	-	1000	
On-State Drain Current <sup>2</sup> $V_{DS} = 1.0 \text{ V}, V_{GS} = 10 \text{ V}$	IRFD120 IRFD123	$I_{D(on)}$	1.3 1.1	-	-	A
Drain-Source On-State Resistance <sup>2</sup> $V_{GS} = 10 \text{ V}, I_D = 0.6 \text{ A}$	IRFD120 IRFD123	$r_{DS(on)}$	-	0.25 0.3	0.30 0.40	$\Omega$
Drain-Source On-State Resistance <sup>2</sup> $V_{GS} = 10 \text{ V}, I_D = 0.6 \text{ A}, T_J = 125^\circ\text{C}$	IRFD120 IRFD123	$r_{DS(on)}$	-	0.5 0.6	0.60 0.80	
Forward Transconductance <sup>2</sup> $V_{DS} = 15 \text{ V}, I_D = 0.6 \text{ A}$		$g_{fs}$	0.9	1.4	-	S( $^\circ\text{C}$ )
Input Capacitance	$V_{GS} = 0$ $V_{DS} = 25 \text{ V}$ $f = 1 \text{ MHz}$	$C_{iss}$	-	380	600	pF
Output Capacitance		$C_{oss}$	-	100	400	
Reverse Transfer Capacitance		$C_{rss}$	-	50	100	
Total Gate Charge	$V_{DS} = 0.8 \times V_{(BR)DSS}$ $V_{GS} = 10 \text{ V}, I_D = 4.4 \text{ A}$ (Gate charge is essentially independent of operating temperature)	$Q_g$	-	14	15	nC
Gate-Source Charge		$Q_{gs}$	-	2	-	
Gate-Drain Charge		$Q_{gd}$	-	6	-	
Turn-On Delay Time	$V_{DD} = 50 \text{ V}, R_L = 80 \Omega$ $I_D = 0.6 \text{ A}, V_{GEN} = 10 \text{ V}$ $R_G = 25 \Omega$ (Switching time is essentially independent of operating temperature)	$t_{d(on)}$	-	7	40	ns
Rise Time		$t_r$	-	28	70	
Turn-Off Delay Time		$t_{d(off)}$	-	45	100	
Fall Time		$t_f$	-	21	70	

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Continuous Current	IRFD120 IRFD123	$I_S$	-	-	1.3 1.1	A
Pulsed Current <sup>1</sup>	IRFD120 IRFD123	$I_{SM}$	-	-	5.2 4.4	
Forward Voltage <sup>2</sup> $I_F = I_S, V_{GS} = 0$	IRFD120 IRFD123	$V_{SD}$	-	-	2.5 2.3	V
Reverse Recovery Time $I_F = I_S, dI_F/dt = 100 \text{ A}/\mu\text{s}$		$t_{rr}$	-	100	-	ns
Reverse Recovered Charge $I_F = I_S, dI_F/dt = 100 \text{ A}/\mu\text{s}$		$Q_{rr}$	-	0.15	-	$\mu\text{C}$

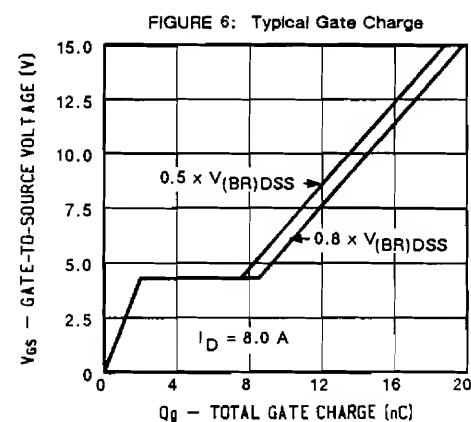
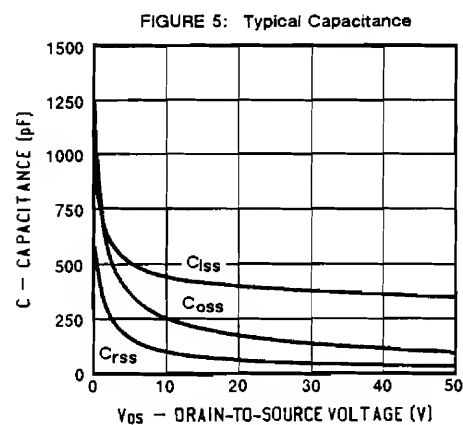
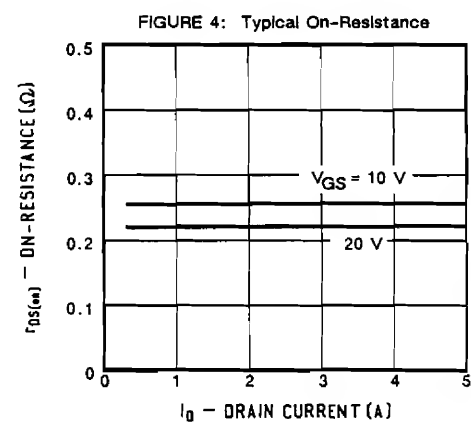
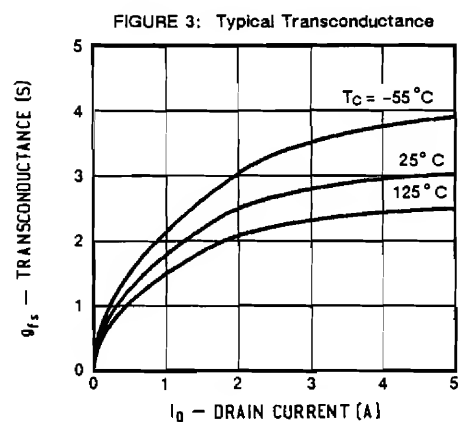
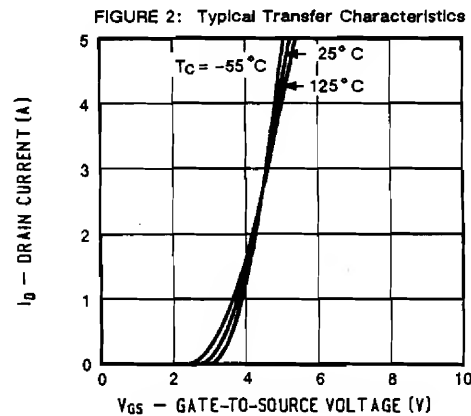
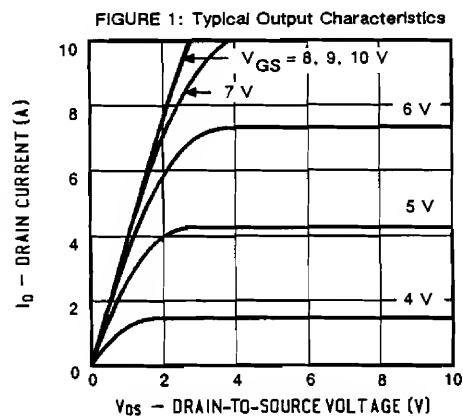
<sup>1</sup> Pulse width limited by maximum junction temperature<sup>2</sup> Pulse test: Pulse width  $\leq 300 \mu\text{sec}$ , Duty Cycle  $\leq 2\%$

PERFORMANCE CURVES (25°C Unless otherwise noted)

Units
V
nA
$\mu$ A
A
$\Omega$
S(V)
pF
nC
ns

(noted)

Units
A
V
ns
$\mu$ C



## PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

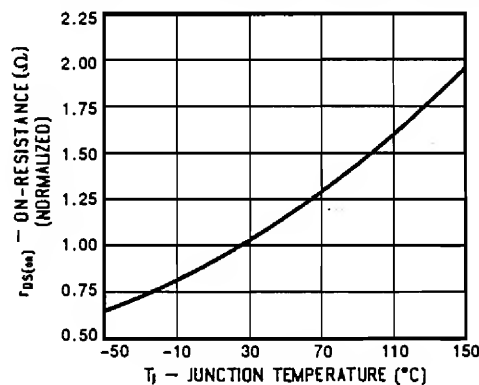


FIGURE 8: Typical Source-Drain Diode Forward Voltage

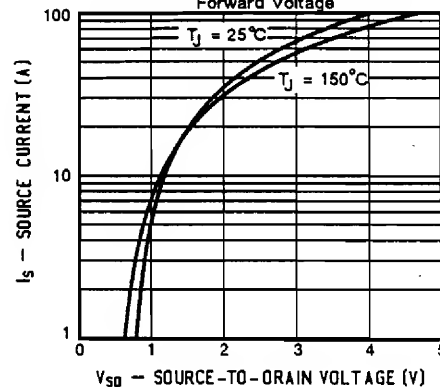


FIGURE 9: Maximum Avalanche and Drain Current vs. Ambient Temperature

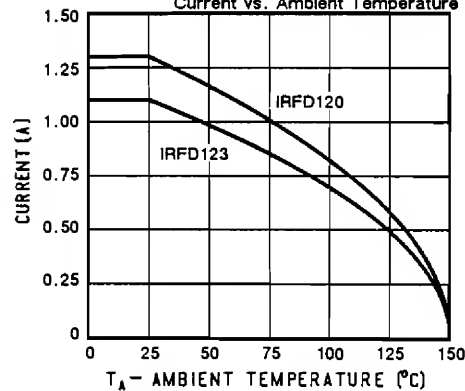
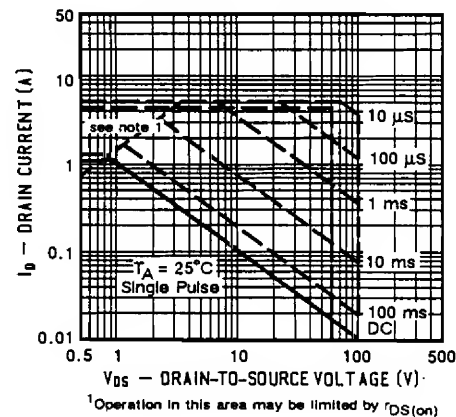


FIGURE 10: Safe Operating Area



<sup>1</sup>Operation in this area may be limited by  $r_{DS(on)}$